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ABSTRACT

A study compared the effects of two writing tasks (short answer exercises and analytic essay writing) with no writing on high school students' understanding of concepts from prose passages. Baseline data on typical patterns of instruction and students' approaches to writing were obtained using observation and case studies in two history classes, one with advanced students, the other with average ability students. Once the sense of context had been established, 22 students from both classes participated in a structured study that included reading history textbook passages and completing writing tasks related to information in the passages, or doing no writing at all. Several learning measures were used, including a measure of concept knowledge. Results from the observational stage indicated that the teachers' intention of implementing writing as learning was co-opted by an academic approach that required certainty and correctness. This approach overlooked students' need to explore new ideas more tentatively, especially for the average ability students. Results from the experimental stage revealed a significant interaction effect for class and writing task at the level of organization of the knowledge measures, with the average ability students imposing more organization on their passage knowledge with essay writing than the advanced ability class. (Author/HTH)

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The Effects of Writing on Learning from Text

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Running Head: THE EFFECTS OF WRITING

Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, 1986

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The Effects of Writing on Learning from Text

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To interpret the effects of writing on learning in a school context, it is necessary to understand the patterns of instruction--the nature of the writing tasks assigned, the kinds of questions asked, and the quality of the feedback provided. This paper reports the results of a study of the effects of two writing tasks (short-answer exercises and analytic essay writing) versus no writing on high school students' understanding of concepts from prose passages. To examine the possible effects of instruction on the results, the investigators employed observational and case study techniques for a period of three months to gather baseline data on typical patterns of instruction and students' approaches to writing in two history classes one of advanced ability and the other of average ability. When the sense of context had been established, 22 students from the two classes participated in a strucutred study that included reading passages excerpted from history textbooks and completing writing tasks related to information in the passages, or doing no writing. A number of learning measures were used, including a measure of concept knowledge.

The results from the observational stage indicated that the teacher's intention of implementing writing as learning was co-opted by an academic approach that required certainty and correctness. This approach overlooked students' need to explore new ideas more tentatively, especially in the case of the average ability students. Results from the experimental stage revealed a significant interaction effect for class and writing task at the level of organization of the knowledge measure with the average class imposing more organization on their passage-knowledge with essay writing than the advanced ability class.

Author Notes

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The Effects of Writing on Learning from Text

Introduction

How do the ways in which students write about text help shape their understanding of the information in the text? Recent research on writing in a school context, whether teacher or textbook assigned, (Applebee, 1984), indicates that high school students do a great deal of writing in content areas such as social studies. However, these tasks range from, answering study questions and report writing to analytic responses to reading assignments. Applebee's (1981) survey of high school writing indicates that only in English classrooms do students write more than in Social Studies classes. For the most part, however, our knowledge of how writing tasks interact with learning content-area information has remained anecdotal and speculative.

In recent years, scholarly argument has begun regarding the relationship of writing and learning (Martin, 1975; Emig, 1977; Odell, 1980). This discussion has focused on the use of writing to refer back to information as well as to foster the integration and consolidation of new knowledge. Some empirical studies have begun to examine how the act of composing itself may lead to learning from texts (Newell, 1984; Langer, 1986; Marshall, 1986). However, if this line of research is to have implications

for the classroom, we must extend our studies to the context of schooling and examine how teachers assign reading and writing tasks, and how, in turn, students respond to those tasks. While the primary purpose of this study is to investigate both the immediate and long-term effects of writing on learning from text in a classroom environment, we will also examine how contextual factors seemed to promote certain attitudes and approaches to writing and learning in two American history classrooms.

Method

Overview

This study examines the effects of no writing and two forms of writing (answering study questions and analytic essay writing) on students' understanding of information in social studies texts. Two questions focused the research: (1) What approaches did a social studies teacher encourage her students to take when they wrote about American history, and how might these interact with students' approaches to the tasks under study; and (2) what are the effects of no writing, answering study questions, and essay writing on learning information from prose passages as measured by fluency, organization, and combination (fluency and organization) of passage-specific knowledge? Data were collected in two stages. During the first stages observational and case

study techniques were employed to gather data on typical patterns of instruction in the students' American History classes. The second stage included a more structured study to examine the contrasting effects of writing on students' understanding of information from prose passages excerpted from American History textbooks.

Phase One: Establishing a Sense of Context.

To establish a collaborative effort, an experienced, highly respected, secondary school social studies teacher who was committed to the aims of the project was selected for the study. Two sections of Jane Adams' eleventh grade history classes participated in the observational phase of the study. The students attended a suburban high school located near a city in the south-central United States. One class included students of advanced ability and the other included students of average and somewhat above-average ability--Phase 5 and 4 respectively in a five level system.

For a period of three months, observational and case study techniques were used to gather base line data on the patterns of instruction in the two classrooms. While one of the investigators observed the classes, the other investigator interviewed eight case study students--three from the average

class and five from the advanced class--and collected the written work they completed for the teacher during the study.

Arrangements were made ahead of time with Adams, and involved no disruption of normal classroom routine. During each visit, one of the investigators sat in the back of the room, taking field notes, talking to students before class, but not participating in class discussions. Most of the classes observed consisted of teacher-led discussions of designated sections of an American history textbook. However, on occasion, the students participated in activities that included simulation of historical events and oral presentations. During each observation, the investigator took field notes, attempting verbatim transcripts of questions and responses when possible. When this was not possible, summarizations were made for later reconstruction.

The second investigator interviewed case study students in a room adjacent to the classroom to describe their responses to the instruction being observed, especially the implementation of writing assignments. All interviews were audio-taped for later analysis. After an initial interview focusing on students' general feelings and responses to routine for writing assignments Adams had made, the discussions centered on how they had completed specific writing tasks.

Since the main focus of this report is the results of the structured study of writing and learning, only the more general tendencies of classroom instruction will be discussed. The picture to be drawn of Adams' teaching represents her typical approach to history and the role of writing in that process. After three months of observation, the data collected included 33 hours of observation, 16 case-study interviews, 2 teacher interviews, and 47 pieces of writing collected from case study students.

Phase Two: An Experiment in Writing and Learning

When a sense of context had been established, a more structured phase of the study was implemented to examine the short-term and delayed effects of the three writing conditions (no writing, answering study questions, and analytic essay writing) on learning information on the prose passages.

Design

A repeated measures design was used with class (average and advanced) as the between-subject factor and treatment (no writing,answering study questions, and essay writing) and time (prior, immediate, and delayed) as with-in-subject factors. Thus, the design was a 2 x 3 x 3 factorial with repeated measures. Order of treatments, and order of stories were

counter-balanced. The dependent measures were the organization, fluency, and combination of organization and fluency of passage-specific knowledge.

The Students

Rather than requiring all students in the two classes to participate in the experimental stage of the project, only those who volunteered were included. Twenty-nine students--twelve in the average class and seventeen in the advanced class--agreed to complete all the reading and writing tasks. However, due to absences, twenty-two students' data were complete and thus included in the analysis. Of the eight case study students, five agreed to compose aloud on the writing tasks. Analysis of data from these students were excluded from the main analysis and will not be reported here.

The Reading and Writing Tasks

The design of the study required that students read three prose passages associated with three writing treatments. Working with Adams, the investigators selected three passages from materials she had planned to employ in her ensuing instructional unit that was to cover American foreign policy prior to World War II and the causes and results of World War II. The passages were selected not only on the basis of content but also (1) a

discourse type of "analysis" (Applebee, 1981); (2) self-contained, that is, no reliance on graphics or other parts of the text; (3) a length of about 700 words to insure that students could read it within a 45-minute period. The first passage entitled "The Roots and Results of Isolationism Prior to World War II" examines American resistance to entering the war; the second passage--"The Monroe Doctorine"--analyzes President Monroe's motivation and the politics that shaped American foreign policy up till World War II; "Accent on Scapegoating" explained the strategy behind Nazi Germany's persecution of the Jewish people.

The three types of writing conditions included in the study were no writing, answering (20) study questions, and analytic essay writing. The no writing condition was included as a control to determine how students would perform on post-tests without the extra elaboration that writing might engender. The two writing tasks derived from Applebee's (1981) categories describing types of school writing were observed. Applebee (1981) reported that study questions are assigned regularly by secondary school teachers with essay writing used much less often. Furthermore, these two tasks represent restricted (study questions) and more extended writing (analytic essay).

The twenty study questions were formulated using Pearson and Johnson's (1978) taxonomy of questions. Within each set of 20 questions, approximately seven questions were textually-explicit, seven were textually-implicit, and six were scriptally-implicit. Students were asked to respond with one or two sentences only. For example,

Q: Why did the failure of the League of Nations to stop Italy, Germany and Japan's aggressions intensify the feelings for isolationism?

A: It intensified because the Senate Munitions Investigating Committee started to investigate the war profits.

For essay writing, students were directed to write analytically about the prose passages. "Given what you have learned from reading the passage on isolationism, write an essay on the causes and effects of isolationism. Be sure to explain and defend your ideas using information from the passage."

The Measure: Passage-Specific Knowledge

The students' passage-specific knowledge was measured using procedures from Newell & MacAdams' (in press) measure as adapted from Langer (1984a, 1984b). This measure reflects the organization and fluency of the students' knowledge as it relates

to the concepts and vocabulary contained in the passages. The procedure elicits topic-related knowledge using free association to key concepts words. Free association responses are categorized into broad levels of complexity which represent ways in which the association may be structured in memory.

3	Highly Organized	Superordinate concepts, definitions, analogies, linking.
2	Partially Organized	examples, attributes, defining characteristics
1	Diffusely Organized	associations, morphemes, sound alikes, first hand experience , no apparent knowledge

The free association responses were rated by the investigator and a second rater. Three "knowledge" scores were derived for each student. The first, a simple count of total responses to stimulus words, measures topic-specific fluency, or the amount of information available to the students. The second, a score reflecting the highest level of organization attained in the responses to each of the stimulus words, measures the quality of organization the student imposes on the information, the third measure combines fluency and organization--the total number of responses that reflect the two most organized categories of

knowledge. Analyses were based on average scores assigned by two independent raters. Interrater reliabilities ranged from .93 for fluency to .78 for organization.

Data Collection

The data for the experimental stage of the study were collected over a period of two weeks in March of 1985. The schedule followed a regular pattern. On the first day students received a packet containing directions for the pre-test of passage-specific knowledge, a passage, and a writing assignment. The next day they received a packet containing the test of passage-knowledge. On the third and fourth days and again in the fifth and sixth days they went through the same process with the passage and writing tasks changing each time. Then one week later they repeated the test of passage-specific knowledge.

For each writing session, the students and one of the investigators met in a room adjacent ot Adams' classroom during the regular class time for American History. At the beginning of each session, the investigator reviewed what they would be doing, and then distributed packets containing a passage and a writing assignment. Students were able to refer to the passage in completing the assignments. The passages were not distributed when students were taking the post-test. Students wrote their

responses in the space provided in the packets. For each reading, writing and testing session, students had the full 45 minute period in which to work.

The data collected during the experimental stage included 44 writing assignments, 66 pre-, 66 immediate and 66 delayed tests of passage-specific knowledge of the passages students had read and studied. Due to students' absences, complete data sets were not available for several students in the two classes. These were dropped from the analysis.

Establishing Context

The main question focusing this study is how writing aids students in learning from text. This was examined by means of a structured study that included Adams' students writing about prose passage excerpted from an American History text. However, before that phase of the study began it was necessary to establish the context in which participating students read, discussed, and wrote about history. The routines, attitudes, and approaches the students bring to writing tasks shape how they will interact and perform. This discussion of context begins to uncover how these were operating in Adams' two classes.

For the most part, the nature of the writing experiences students encounter in a school setting are "on the whole,

extremely limited and unrewarding. . ." (Applebee, 1984, p. 591). However, it is also unclear as to how writing might lead to changes in knowledge and concomitant levels of reasoning. To sort out what various writing tasks might contribute to learning in content-areas we need to understand the conditions under which teachers assign and students complete writing tasks. What aspects of the curriculum, hidden or otherwise, operate to affect how students approach writing? If, as Applebee has stated, students are taking little from writing, then we must explore reasons why teachers have difficulties with implementing writing that fosters learning.

A Course in American History: Staying in Phase

Adams' two classes of American History for eleventh graders covered roughly the same content , beginning with the Civil War and ending with a look at more contemporary issues. However, Adams has consciously designed and planned the curriculum for each course somewhat differently. With the average class she took a more chronological approach, while with the advanced class she used a topical approach.

Average		Advanced	
12 Week Periods	Content	12 Week Period	Content
1st	Post Civil War to turn of century	1st	Political-Economic Development
2nd	1898 to 1939	2nd	Social-Cultural Development
3rd	WW II to Present	3rd	Foreign Policy

"You have to allow for differences. Some of the average group will go on to College but not all that many. I've got enough of the material the college-bound needs. The advanced class really needs to get through a lot, but I also want them to have a way to think about it all. That's why I take a topical approach." As the school year progressed Adams discovered that the average ability group needed more support than she had anticipated. "Their depth of knowledge, depth of work is not quite what it has been in the past. I had misgivings about allowing some of them into this phase level. They are not doing well on test performance and overall attention to detail."

In both classes, the textbook served as a source of most of the information. But Adams also relied on filmstrip, supplemental reading materials, and some simulation exercises, which she took quite seriously. "Much of the history stays inert unless there's a way to make it come alive. Simulating various

historical events like the Stock Market Crash helps them think about the material in a special way." Each week Adams made reading assignments from the textbook by noting the chapter and the day it would be discussed on the board. Supplemental readings were used for "extra credit projects" as well as to bring depth to the textbook's coverage of the material. With both the regular fare from the textbook and supplemental reading, Adams directed the students to read the material but she seldom introduced the reading or set any specific purpose for reading. For the most part, reading assignments functioned only as background for her lectures. This was especially true for the average class that "find some of the history interesting but wouldn't think of sitting down and reading about it." On occasion she gave quizzes to encourage students to read, but felt that quizzes did not guarantee they would read.

The average and advanced curricula consisted of reading, discussing, and taking tests on the material. Adams was well organized and took time each Monday to review assignments for the week which she expected students to record in their notebooks. An example from a unit on the Roaring 20's for the Honors class was typical.

Feb. 7-8 1920's Presentations due

Feb. 9-10 Read Chapter 10 in text

Feb. 10 Journal due

Note: Feb. 22 Book Reviews definitely due!

Adams reported that her advanced students were always quite good about getting work completed on time, but that the average class always had more than its share of people who turned in very little written work. "They know they'll be graded down for it but they still don't get much of the writing done." While this led to two different sets of expectations as far as writing assignments were concerned, Adams insisted that she could not change the course content of the average class. "No, I can't change anything just because they are not performing. They selected the phase level and so they're responsible for the work. The only things I have done is cut back on the longer writing we do in the lower phase." What this meant in practice was the average class did less writing in and out of class and Adams assumed more control over the lessons. Bill, one of the case study students complained that in Adams' average class "it was hard to get a word in edgewise at times--she just keeps going."

Writing about History: Differences in Teacher and Student Intention

A major reason for Adams' interest in a research project on writing is that she believes "writing can bring about learning because it makes them think." Although the tasks were not always extended, Adams assigned at least one piece of writing each week in her advanced class. But because using writing was "like pulling teeth" in her average class, they did somewhat fewer out of school assignments. While both advanced and average classes had essays to write as part of their unit tests, Adams had also developed an assortment of "long term" writing assignments that allowed for broader responses to the history they studied.

Early in the school year Adams gave both classes a choice of two assignments--a book review or a reading journal. The reading journal could include a response to fiction or non-fiction and was to be written as a journal or diary. A handout on keeping a reading journal stated how the students were to respond.

> This is an informal approach to reviewing a book. In it you make entries as you go along and you give your reactions to what you read, what you think and feel about what you are reading. . . the journal is an informal, first person approach. . . 3 pages in length and should contain at the end

a paragraph or two giving the overall content of the book and your overall evaluation of the book.

Following the general description, was a set of examples of comments that students had written in previous years.

The book review was a more "formal, third person approach--2-3 pages typed, 4-5 handwritten minimum." The review was to be written in essay form that included "opinions, reactions, interpretation to various aspects of the book, just as you do in a journal". The distinction that Adams made between the journal and review reveals how she intended to respond to the writing: "Do not use the personal pronouns, I, me, my, etc. try to word your essay to keep it formal in tone. Example: Do not - 'I enjoyed the book because' Do-'One enjoyable aspect of the book is that. . ." While she believed these writing assignments were an important part of learning history she did not integrate them with the history that was discussed in class. And since she could not easily use the students reading and writing in class, the students saw the work as "extra work for extra points". This attitude was reinforced by the comments she wrote on the students' writing, and ultimately influenced the students' attitude and approach to the writing.

During a unit on "The Industrial Revolution" Mike, one of the

case-study students in the average class, wrote a book review on Robert Kennedy's To Seek a New World. In constructing his review, Mike carefully followed the questions in the handout--Who was the author? How did the author use the tools of history (e.g. letters, diaries, etc.)? How successful was the author in attaining aims for himself? As preparation, he skimmed the book writing down answers to the questions. Then he wrote out his review, organizing it with the order of the questions and his responses, and checking occasionally to see if he had included enough material. While Mike was quite interested in the book, he became pressed for time and focused only on Adams' questions, rather than that interest. Consequently, he was not satisfied with the results. "I got so busy with trying to keep up with the regular history assignments that I had to do it (the review) rather fast." In turn, Adams' evaluation was primarily interested in the form rather than the content of the essay. "You make some good points but you need to work on your grammar. Overall summary needed to conclude the review." Mike thought the comment was helpful because "it makes you better aware of how you wrote it, and not to do it the next time."

This brief discussion of the context Adams' had created for writing in general and the book review in particular is not to

find fault with her teaching or her students' learning. They are working within a school tradition that views the role of the teacher as a purveyor of knowledge who measures performance against certain standards (Barnes, 1975). The writing assignments that she implements to foster learning become in the eyes of the students, tests to evaluate if they have included specific information in the correct form. Adams has a reputation as a good teacher, confident in her understanding of students, their abilities and the content of the curriculum. She is willing to try new strategies, However, while her ostensible purposes for writing are "to express, to interpret, and to compare ideas" they are ultimately co-opted by her need to "evaluate real learning." This leaves us with the question of what capacities her students have for reasoning and exploring ideas when they formulate their own responses to text. Moreover, we must consider possible alternatives and what the outcomes of those alternatives might be. We now turn to the experimental portion of the study, where two writing tasks and no writing were examined for their effects on students' immediate and later understanding of content-area information

Learning from Writing: Results of the Experiment

We have thus far examined how Adams' students discussed and

wrote about American history. As part of her repertoire of assignments , Adams' assigned both extended and restricted writing. While these tasks require putting pen to paper, previous studies (for e.g. Newell, 1984) have suggested that the nature of the task influences what students will learn about the topic. We now turn to the results of the structured part of the study that examined this issue.

Learning was measured by having Adams' students read, write (or do no writing) and then complete a test of passage-specific knowledge at three intervals of time--before, immediately after, and one week after the writing. Univariate analysis of variance with repeated measures was employed to determine the main effects of writing task, time, and class on results. Given that the context of the passages might affect what students took from the reading and writing tasks passage was counterbalanced across task. We predicted a significant main effect for writing task for time, and for class at all three levels of the knowledge measures (fluency, organization, and combination of organization and fluency). Our analyses indicated that there were significant main effects for task, time and class as well as interactions. However, it is beyond the scope of this discussion to detail all of the results of the study. Instead we will focus on a finding

that may be the most interesting--the significant interaction effect for class and task.

Interaction of Class and Task

In our discussion of the context which Adams created for writing in her American History class, we saw that when assigning writing in her two classes she had a different set of expectations for her average class. Adams believed that their reluctance to read and write required her to assume more control over their learning, and eventually she began to assign more restrictive writing. As we saw with Mike's discussion of writing a book review, even with extensive, long term writing projects Adams asserted control over form and content. This leads to the question of what capacities for learning students demonstrate when they are given ownership of their own reading and writing.

Given that the average class tended to write less often and less extensively we would expect them to perform less well than the advanced class at all three levels of the knowledge measure. Generally, the results indicate that this was the case for measures of fluency and combination. However, when the effects of interaction of class and task on the organization measure are examined, a rather interesting finding emerges. Table 1 indicates that there was a significant interaction effect for

TABLE 1

Knowledge Organization: Effects of Writing Task and Class

Writing Task:	Means (SD's) No Writing		Questions		Essay	
Class:	Average	Advanced	Average	Advanced	Average	Advanced
	1.21 (0.41)	1.74 (0.38)	1.18 (0.50)	1.83 (0.60)	2.02 (0.09)	1.83 (0.47)

ANOVA

Source	df	F	Significance
Between			
Class	1, 20	11.88	.002
Within			
Writing Task	2, 19	10.97	.005
Task by Class	2, 19	7.60	.01

class and task at the level of organization of the knowledge measure. While the means for no writing and study questions are in the predicted direction with the advanced class imposing more organization on their passage-specific knowledge after no writing and study questions than the average class, essay writing enabled the average class ($\bar{x}$ = 2.02) to impose more organization on their knowledge of key concepts from the passage than the advanced class ($\bar{x}$ = 1.83). This finding suggests that extensive writing enhanced what students in the average class learn from text more than what the advanced class learned.

It may be possible that students in the average class who generally have not developed reading strategies found the text-forming aspects of essay writing useful in shaping what they took from the text. Perhaps, in turn, the advanced students took a more routine approach to essay writing that did not allow them to impose the kind of organization on the information that the knowledge measure calls for. In any case, thais finding suggests that in spite of the average classes' reluctance to write they do seem to possess the capacity to integrate and reconstruct information from text. Perhaps essay writing allowed them to focus on larger issues and topics in ways that the no writing and study question conditions did not. Further research is needed to

explore how students of varying abilities learn from writing.

General Discussion

We began this discussion by posing the question how does the way students write about text shape their understanding of the information in the text? While we focused on a specific set of results, generally the findings indicate that essay writing has a powerful effect, allowing students to construct a well-integrated structure of information from text. Students from the average class seemed to take particular advantage of the text-forming aspects of extensive writing that requires a reconstruction of information taken from the text for another reader. This process enabled them to develop a more complex understanding of the information than restricted writing or no writing.

The picture that emerged from our examination of the context in which Adams' students found themselves was that in spite of her concern for writing as learning and her attempts to implement writing in her American History classes, her need to monitor her students' learning of content and form short-circuited what students might have taken from that writing. Recent studies (Marshall, 1984, 1986; Swanson-Owens, 1986) have documented similar problems with implementing writing. It seems clear that the conditions under which Adams assigned writing were not

particularly conducive to the kinds of learning that was evident in the experiment. Consequently, there remains a larger question of how writing might be implemented in such a way to foster more reasoned thinking about content-area information.